78 and absorbed, equalized, and redistributed simultaneously in the same manner as the fluid pressure wave front.

Upon release of the treadle valve **19**, it will be readily understood that the fluid pressure differential acting on the diaphragm **10** will be reduced to ambient atmospheric pressure having the effect of relieving the quick release diaphragm's **10** sealing effect on the quick release cover's exhaust ports **103**. The higher fluid pressures existing within the invention, the conduits **42-51**, and the actuators **27-36** will form the diaphragm **10** against the diaphragm support **68** and the inner surface **75**, opening communication with the atmosphere through the cover plate exhaust ports **103** and exhausting the fluid pressure to the atmosphere and thus de-energizing and re-forming the shock absorber **7** to its original frustoconical shape and simultaneously returning the piston **6** to the established position of rest against the retaining ring **17** in FIG. 10 to assure like performance during the next braking cycle. The diaphragm **10** will return to its position of non-flexure (rest) when the said pressure drops to atmospheric pressure.

The Spero apparatus U.S. Pat. No. 4,166,655 is used in conjunction with any of the quick release valves of Horowitz, U.S. Pat. No. 3,093,153, Vorech, U.S. Pat. No. 2,040,580, or Andrews, U.S. Pat. No. 2,718,897, and due to the effects of "isentropic and adiabatic flow" through the various quick release valves and their inherent pressure differentials, there will always exist a calculable imbalance in fluid pressure to the air actuators.

While the invention has been particularly illustrated herein and described with considered preferred detail, it will be readily accepted by those skilled in the art such that various alterations of the embodiments of this invention may be made without departing from the spirit of the invention. Be it known that the embodiments of this invention, alterations and modifications falling within the scope of the invention are covered by the claims that follow.

What is claimed is:

1. A differential pressure regulator quick release valve for fluid pressure brake systems having an integral design subject to fluid pressure differentials, contaminants and particulates, having disposed therein a retaining ring, a rigid piston and an elongated, resilient, yieldable, shock absorbing member disposed on a first face of said piston in a walled cylinder and chamber associated therewith said retaining ring disposed for boundary means on a second flange face of said piston and whose function is for consistent, like dampening reactions at a conclusion of compression of said shock absorbing member and said member being returned to

an original configuration and said boundary means restricting travel of said piston to a position in said cylinder at completion of depressurization, said cylinder having oil dispersed therein; and as said valve receives fluid pressure having said pressure differentials being delivered to a delivery channel thereof having centralizing means via a housing with a protrusion, an inlet port and said protrusion having a first diaphragm means disposed therein to interrupt communication with cover plate of said protrusion having exhaust ports and said delivery channel centralizing and isolating said fluid pressures and pressure differentials in a base chamber having laterally aligned outlet ports and pressurizations acting on a flexible covering having an inner face and an outer face for acting on said piston's second face and said piston being restricted by said boundary means and said covering having a continuous peripheral portion extending from second diaphragm means thereof, an outer surface of said second means forces an inner surface thereof into contact with a second end such that pressure is transmitted to said piston causing said piston to deform said member into a cylinder housing and delivering pressure directly from a base housing chamber to said outlet ports.

2. A differential pressure regulator quick release valve for fluid pressure brakes systems as recited in claim 1 wherein said base housing having said inlet port which is protruding and said axially aligned exhaust ports and disposed therebetween first means having fluid pressure delivered upon said first means and said first interrupting communication between said protruding inlet port and said laterally aligned outlet ports and allowing for unobstructed pressure differential shock to act upon said first means and said shock being freely delivered directly via said isolating and centralizing means, into said base chamber and said shock acting upon said second diaphragm means transmitting said shock to said rigid piston having dampening means at a position of rest at said boundary means and deforming and energizing said elongated shock absorbing member therein said cylinder chamber and said fluid pressure being delivered through said laterally aligned outlet ports via said conduits to brake actuators and hence pressure differentials generated by said actuators being transmitted via conduits and said outlet ports to said base chamber and acting upon said second means, said actuator pressure differential shocks being dampened as said second means contacts said dampening means and equalized by said energized deformed elongated member and simultaneously redistributed freely having no interference from said pressure differential at said first means.

3. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1 having an integral design that is subject to fluid pressure differentials,

contaminants and particulates, wherein said boundary means establishes a point of rest of said rigid piston at said completion or conclusion of depressurization, said piston having fluid pressure dampening means, and said boundary means preventing destruction of said second diaphragm means.

4. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 3 wherein said cylinder housing and said base housing with said protrusion having aligned said inlet and exhaust ports, being disposed therein and separated by first means and having isolating and centralizing means, a base chamber, and laterally extending outlet ports, said base chamber being separated from said upper cylinder chamber by a second means and having disposed therein said cylinder chamber, said boundary means, said dampening means, said O-rings, said energized elongated member, said oil, and said first means engaging diaphragm support of said inlet port interrupting communications with said inlet port, said isolating and centralizing means, said base chamber, and said outlet ports so that fluid pressure application contained within said valve, conduits and brake actuators and said fluid pressure reducing to ambient atmospheric pressure through said exhaust ports simultaneously de-energizing said elongated member re-establishing said dampening means at contact with said boundary means.

5. A differential pressure regulator quick release valve for fluid pressure brake systems having an integral design that is subject to fluid pressure differentials, contaminants and particulates as recited in claim 1, wherein said delivery channel having centralizing means for said fluid pressure and pressure differentials delivers the same to an outer surface of said base housing chamber and pressures being dampened by said second diaphragm means contacting and delivering pressure to said dampening means.

6. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1 means is disposed in a concavity of said protrusion housing controls communication between said inlet port and said isolating and centralizing means and for controlling communication between said outlet ports and said isolating and centralizing means and said cover plate's exhaust ports and being imperforate and a diameter portion positioned to interrupt communication between said inlet port and said outlet ports, said outlet ports being connected to opposing brake actuators.

7. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 6 wherein means for interrupting communication with said outlet ports, said

isolating and centralizing means and said exhaust ports and for freely delivering fluid pressure through said isolating and centralizing means to said base chamber wherein a pressure wave front shock is centralized within said base chamber and thereby delivering fluid pressure through said outlet ports via conduits to said brake actuators therein returning pressure differentials caused by said brake actuators via conduits and said outlets to said base chamber, said actuator caused differentials being freely dampened by said second diaphragm means pressurizing dampening means.

8. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 6 wherein said second means has an outer surface and having a periphery disposed in an end face of said base housing and a cylinder housing face and whose composition withstands pressures upwards of 1000 psi and outer and inner surfaces being free of rigid bondings eliminating corrosion fragments and enhancing life of said second means.

9. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 6 wherein means for interposition or interposing in said protrusion between said inlet port and said exhaust ports.

10. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 6 therewith a base housing protrusion quick release cover plate that is axially aligned with said inlet port and having means interposed therein and said quick release cover plate having exhaust ports and being fastened to a concavity of said base housing and having a seal ring disposed therein.

11. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1 wherein said isolating and centralizing means delivers fluid pressure directly to said base chamber of said base housing wherein said fluid pressure and pressure differentials transmit said pressure to said outer surface of said second diaphragm means forcing its said inner surface to make contact with said dampening means that is bounded on a second end flange thereof by said boundary means fixing a position of rest of said dampening means and forcing the same to deform said elongated member into cylinder housing.

12. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 6 wherein an upper cylinder housing has disposed therein said elongated shock absorbing member, said oil, and dampening means having two O-rings disposed in respective semi-circular counterbores containing said oil within upper cylinder chamber and a non-energized position of said dampening means being established by said boundary means

thus having consistent reactions to fluid pressure and preventing destruction of said second diaphragm means.

13. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1, said valve has an integrally determined relationship in a plurality of brake actuators having said inlet port which is protruding connected by a conduit to a relay valve outlet port and said outlet port supplying fluid pressure via a conduit to said inlet port and said first diaphragm means interrupting communication between said laterally placed outlet ports, said isolating and centralizing means, said exhaust port and said first means communicating said fluid pressure through said centralizing means to said outlet ports via conduits to two said brake actuators which are opposing and upon reduction of fluid pressure to ambient atmospheric pressure first means to interrupt communication between said inlet port and said laterally placed outlet ports and permitting fluid pressure volumes within said opposed actuators, said conduits and said base chamber to rapidly simultaneously reduce fluid volume to ambient atmospheric pressure through said exhaust port of said valve.

14. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1 wherein said valve has isolating and centralizing means for directing fluid pressure shock to base chamber.

15. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1 wherein said upper cylinder has said boundary means establishing a point of rest of said dampening means.

16. A differential pressure regulator quick release valve for fluid pressure brake systems as recited in claim 1 oil being disposed in an upper cylinder chamber of said cylinder housing and oil having a minimal compressibility and said cylinder chamber having an amount of ambient air disposed therein, and said elongated member in an energized state being deformed into said cylinder chamber and oil becoming aerated oil gaining compressibility and being essential to absorbing shock from fluid pressures acting upon said second means and said dampening means.

17. A differential pressure regulator quick release valve as cited in Claim 1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 16 and being a pneumatic closed-looped antilock pressure-modulating device for pneumatic brake systems, as cited in said claims, having an integral design and installed to receive delivery fluid pressure from a relay valve via an inlet port and a delivery channel and delivering said fluid pressure to opposing air chambers on a single axle via a

delivery channel to a base chamber, said pressure flowing through opposing outlet ports via conduits that are connected to opposing air chambers, said chambers receiving said fluid pressure and filling said air chambers, thereby creating mechanical leverage and advantage via a push rod whose opposing end is attached to a slack adjuster, said slack adjuster having an interface via a worm gear in an opposing end whose gear teeth interface with the splined end a of cam shaft whose opposing end is formed in the shape of an "s", said "s" cam thus contacting the rollers of two drum brake shoes, said shoes being semi-elliptical with an end being hinged and an end having a roller, said "s" cam being located between said rollers of said brake shoes, said "s" cam shaft then having torque and rotating to opposing points of contact with said rollers, thereby having adjacent points of contact and direct interface with said brake shoes and said brake shoes having friction material that is riveted to the outer circumference for contact with a rotating circular brake drum to create an interface with friction coefficient, said lining and drum interface being between different geometries therewith a wheel and a tire attached to the brake drum, said tire interfacing with a road surface whose interface variations from a multi-variable surface is transmitted via the collective interfaces of the tire, wheel, friction material, brake shoe, rollers, "s" cam, slack adjuster, push rod, air chamber and fluid pressure, said variations or input causing analog pneumatic shock wave signals to transit through the compressed fluid interface in the opposing air chambers and the attached conduits at variable speeds, said signals exceeding the mach speed, said signals being infinitely variable between limits, and said signals being sensed at the base diaphragm, said base diaphragm having an interface with a piston, said piston having an interface with an elongated elastomeric member, said elastomeric member having an interface on the opposing end with the rigid cylinder surface, the ambient air whose contained pressure is sea level, and 2 ounces of hydraulic oil contained therein, said variable analog fluid pressures being modulated by compressing the base diaphragm, the piston, the elongated elastomeric member, the ambient air and the hydraulic oil, whose action dampens the said infinitely variable signals therewith the output being adjusting brake actuating forces thereby relieving the pressures at the friction material-brake drum interface thereby controlling the degree of wheel angular rotation without venting fluid pressure to the atmosphere.

18. A pneumatic closed looped pressure-modulating device for pneumatic brake systems as cited in claim 17 said brake assembly having an air actuated caliper, said caliper having an air chamber with ability to clamp, and shoes or pads having friction material bonded thereto

and or riveted to the inner surfaces of two opposing surfaces and disposed to become directly adjacent to a rotating rotor spinning there between, said friction material contacting the outer surfaces of a rotor that is mounted on a spindle, said spindle being attached to the opposing hubs of the axle, and said rotor being attached to a wheel and a tire, and said caliper being actuated with fluid pressure to cause said caliper to clamp about the surfaces of said rotor and said interface generating analog pneumatic signals in a the air chamber of said caliper and said chamber transmitting said variable signals of the tire and road surface interface, via the collective interfaces of said tire, rotor, caliper and friction material, said analog variations being input that is transmitted via the pneumatic fluid pressure signals from the caliper air chamber via conduits to the base diaphragm, whereby said diaphragm interfaces with said piston, elongated membrane and said hydraulic oil, therein interpreting said analog pneumatic signals and said output means directly transmitting said signals from the cylinder diaphragm back to said caliper air chamber, thereby adjusting the actuating forces of said caliper-friction material interface and automatically controlling the rate of angular rotation of said wheel.

19. A pneumatic closed-looped antilock pressure-modulating device as recited in claim 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 17 and 18 wherein said base diaphragm senses analog pneumatic signals whose variations are generated by the angular rotation and interface of the road surface, said pneumatic signals being transmitted through the interfaces of said brake components and said pressurized fluid, said fluid having an interface with said opposing air chamber and said cylinder diaphragm, said diaphragm receiving said pneumatic signals at the rate of angular rotation of said wheels, said cylinder diaphragm, therewith said piston, said elongated member and said hydraulic oil thereby interpreting and modulating said analog pneumatic signals and transmitting dampened output signals that adjust the actuating forces of the compressed fluid pressures in said air chambers thereby controlling the degree of the rate of angular rotation of said wheels.

20. A pneumatic closed-looped antilock pressure-modulating device for pneumatic brake systems as cited in claims 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18 and 19 whereby the rate of angular rotation of said wheels is automatically transmitted to a base diaphragm via conduits that are integrally attached to opposing inlet ports and said signals being transmitted from the air chamber to the fluid pressure in the base chamber and said fluid pressure interface between said fluid pressure and said cylinder diaphragm is the conductor for said pneumatic signals thereby directly adjusting said actuating forces within said air chamber, said

transmission of said signals are adjusted in a closed-looped system between said air chamber and said cylinder diaphragm without venting air to the atmosphere.

21. A pneumatic closed-looped antilock pressure-modulating device for pneumatic brake systems as cited in claims 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18 and 20 wherein pneumatic signals that are generated by the interface between said brake friction material and said brake drum are transmitted from the air chamber, said pneumatic signals having a wave transmission speed greater than mach speed and said base diaphragm transmitting pneumatic signals less than mach speed therein a closed-looped system and thus automatically controlling the rate of angular rotation of the wheels at opposing end of a single axle.

22. A pneumatic closed-looped antilock pressure-modulating device for pneumatic brake systems, as cited in claims 1, 17, 18, 19 and 20 wherein said air chambers have a service brake chamber and an adjacent emergency brake chamber, said emergency brake chamber being spring actuated when pneumatic pressure reduces to 30 psi from 120 psi, said 30 psi pressure releasing said spring in said emergency brake chamber thereby actuating the brake interface between said friction material and said brake drum thereby stopping the vehicle in the event of a malfunction or compromise of said closed-looped system.

23. A pneumatic closed-looped antilock pressure-modulating device for pneumatic brake systems, as cited in claims 1, 17, 18, 19, 21 and 22 whereby said air brake chamber for said fluid pressure dropping from 120 psi to 60 psi automatically actuates a malfunction warning light signal, a buzzer and pressure gauges in the cab of the tractor, bus or truck vehicle, said signal being instantly visible and audible to the driver of the vehicle thereby alerting the driver to a possible malfunction of the closed-looped system, said warning being made to permit the driver to voluntarily stop the vehicle before said emergency brake chamber mechanism renders said vehicle immobile, such that repairs can be made to said closed-looped system.

24. A pneumatic closed-looped antilock pressure-modulating device for pneumatic brake systems as cited in claims 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, and 20 whereby said brake drums and said rotors have surface imperfections and eccentricities, and braking cycle events being dynamic, said friction materials contacting said brake drum or rotor alternating through a series of phase shifts, said surfaces having micro fissures and variable friction surfaces, and said friction interface generating heat and material expansion, said expansions, eccentricities and variations creating variable analog pneumatic signals during the dynamic braking cycle, and said signals being transmitted in a closed-looped system to said

base diaphragm, piston, elongated member and oil disposed therein, therewith modulating and oscillating said signals, said modulated signals thereby being transmitted to said air chamber or said caliper air chamber, thereby controlling the rate of angular rotation of said wheels.

25. A pneumatic closed-looped antilock pressure modulating device as cited in Claims 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18 and 24 whereby said interface between said brake drum or rotor, and friction material is subject to dynamic contact between said brake drum or rotor that is rotating, and said friction material whose position is fixed at the interface contact moment, said interface having momentum and being dynamic, eccentric and shifting in phase, said phase shift being transmitted to the air chambers, and said chambers transmitting variable analog pneumatic output wave signals to said base diaphragm, and said diaphragm sensing said analog signals, therewith said diaphragm, said piston, said elongated membrane and said oil generating output signals to adjust the actuating forces of the fluid pressure in said air chambers via conduits and said transmissions being made in a fully closed-looped system.

* * * *